START
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Richland Operations Office
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FEB 28 1995

Mr. Russell Jim, Manager
Environmental Restoration/
Waste Management Program
Yakama Indian Nation
P.O. Box 151
Toppenish, Washington 98948

Dear Mr. Jim:

REPLY TO YOUR LETTER DATED JANUARY 24, 1995, CONCERNING THE ENVIRONMENTAL RESTORATION DISPOSAL FACILITY (ERDF)

On behalf of the U.S. Department of Energy, Richland Operations Office, I would like to express appreciation for the efforts of the Yakama Indian Nation (YIN) in providing to the remedy selection process that has culminated in the ERDF Record of Decision (ROD). In this process we have endeavored to be responsive to the expressed concerns of the YIN. We have listened and responded to those concerns to the best of our ability and have modified the ERDF strategy as a result.

It is realized that we may not have reached agreement on all of the issues. However, in concert with the U.S. Environmental Protection Agency and State of Washington Department of Ecology, we have made great efforts to address the concerns of the YIN in the process of developing the ERDF ROD. We feel that ERDF is the best solution, within budgetary constraints, for disposal of Hanford remediation waste.

Response to the issues raised in the subject letter is provided as an attachment. We hope that the YIN will continue to join us in our efforts to remediate the Hanford Site.

Sincerely,

Richard A. Holten, Director
Plateau Remediation Division

PRD:OCR

Attachment

ATTACHMENT

Response to Yakama Indian Nation (YIN) Comments
Concerning the Environmental Restoration Disposal Facility (ERDF)
Dated January 24, 1995

Response to Comments Contained in the Letter:

Comment.

Our comments indicate disagreement with the facility as it is presently planned. As we have documented in the past, we disagree because it would require perpetual institutional controls to effect monitoring/remediation, and would prohibit general, unrestricted use of the land by future generations. Such an imposition is inappropriate and inconsistent with the use of the land and waters as guaranteed by the treaty of 1855.

Response: We do not believe the construction, operation, and closure of ERDF will violate any YIN treaty rights. After the post-closure period, the ERDF site and surrounding area would be capable of supporting surface uses compatible with many possible land use options, including any treaty rights that might be applicable.

Comment.

1. Summary of Design as Proposed--The ERDF is proposed to serve as the central receiving facility for remediation wastes generated from cleanup of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) past practice units and Resource Conservation and Recovery Act (RCRA) corrective action activities primarily within the 100 and 300 Areas (including near the Columbia River) at the Hanford Site. Such a facility is called for under Milestone M-70-00 of the Tri-Party Agreement.

The ERDF would be designated a *Corrective Action Management Unit* (CAMU) under 40 CFR 264.552 and, as such, would accept only wastes originating from on-site. DOE states that the facility is expected to receive 28.5 million cubic yards of remediation wastes consisting of contaminated soils, sediments, sludges, burial ground waste, pond and trench waste, and demolition debris including pipelines and ancillary equipment. This material would be classified as chemical, radiological (low-level) and low-level mixed waste.

The proposed location of the ERDF is on the 200 Area plateau between the 200 West and 200 East Areas. This location is nearly free of existing soil contamination, but is underlain with contaminated ground water from the 200 West Areas. The primary design element of the ERDF consists of a single trench excavated below grade. This trench would be filled with remediation waste and closed with a protective surface barrier. Supporting facilities including administration buildings, railroad spurs, waste off-loading and transport equipment, and waste treatment and equipment decontamination facilities are also included as part of the ERDF.

The subject Remedial Investigation/Feasibility Study (RI/FS) discusses cultural and ecological resources of the 200 Area, waste characteristics and contaminants of concern. The document also discusses remedial action objectives of the ERDF site and identifies, selects, and evaluates certain remedial technologies and alternatives. Alternatives that would allow general unrestricted management of the surface and surrounding areas at 100 years past closure, including uses that include significant influx of water from agricultural activities, as was identified by the YIN in the scoping of the planning for the ERDF, are not considered.

Response: The ERDF will not be operated as a CAMU. It is a landfill authorized under CERCLA to receive Hanford remediation waste. The estimated maximum of 28.5 million cubic yards of waste is considered a worst case condition and is based on total removal of all waste sites in the 100, 300, and portions of the 200 Areas. This upper bound limit is considered very conservative and remediation activities will undoubtedly result in less waste removal and disposal. Current waste projections have deferred the need for the rail spur and minimized the support facilities.

It was not considered realistic to model a strictly agricultural scenario on top of the waste facility. However, the "hypothetical wetter climate" analysis done in the RI/FS included a significant influx of water and could be considered to approximate such a scenario. A performance assessment is being done, per DOE Order 5820.2A, that will aid in defining ERDF operating parameters and waste acceptance criteria. In the performance assessment, the irrigation scenario is considered an inadvertent intrusion scenario. The resultant increase in dose created by enhanced infiltration would be matched by the increase in the performance objective (4 to 100 mrem/yr). This may influence waste treatment alternatives, waste acceptance criteria, and/or final ERDF cover design performance objectives.

2. General Comments:

a. The ERDF would result in alternatives including excavation and on-site disposal ranking higher in operable unit RI/FS documents than alternatives involving treatment mechanisms. Thus, the ERDF inhibits recycling efforts and the identification and development of innovative technologies, such as calcining to reduce volume and eliminate toxicity, and melter/slagger recovery/waste separation processes, and ignores the systems-engineering approach to efficiently and effectively use available resources for cleanup of the entire Hanford Site. In addition in-situ soil washing using freeze barrier technology to separate contaminated and uncontaminated soils during remediation is not considered.

Response: The ERDF does <u>not</u> inhibit recycling or treatment of waste; such options are regulatorily preferred whenever feasible and cost effective. Evaluation of operable unit waste site remedial alternatives is not within the scope of the ERDF RI/FS. The operable units use the feasibility study process to evaluate remedial alternatives and chose an effective option. Alternatives such as calcining, recovery/waste separation processes, soil washing and in-situ techniques are potential options. Although it is not possible at this time to anticipate what alternatives will be selected for the operable units,

each potential remedial option will be appropriately evaluated. Constructing

the ERDF will allow operable units the flexibility to consider the alternative of land disposal as a realistic option. The YIN will have the opportunity to review and comment on operable unit remedial alternatives.

b. The ERDF would be inconsistent with and preclude implementation of the YIN's desired final remedy for the Hanford Site and thereby may violate section 300.430 (a)(ii)(B) of CERCLA. (Specifically, see comments 12 through 14 of Attachment A. Other applicable comments include numbers 4 and 16 through 19).

Response: Section 300.430 (a)(ii)(B) of CERCLA states that "operable units... should not be inconsistent with or preclude implementation of the expected final remedy." The ERDF is neither inconsistent with, nor precludes any option the operable units may chose as a final remedy. The existence of an on-site facility enhances the ability of the operable units to select a remedy consistent with the most effective remedial alternative for a particular waste unit. In the short term, ERDF is consistent with the recommendations regarding future land use options contained in the Hanford Future Site Uses Working Group report. In the long term, the ERDF site and surrounding area would be capable of supporting a wide range of surfaces uses.

c. The ERDF would be a permanent facility located on "sacrificed" land for the disposal of all wastes not identified for deep geologic classification (chemical, radioactive, mixed). Disposal practices would be in violation of DOE Order 5820.2A. (Specifically, see comments 1 and 19 of Attachment A).

The document does not consider the socioeconomic values placed on the land by the YIN, and provides little consideration of their cultural values of the land. (Specifically, see comments 5 and 15).

The ERDF would result in contamination of clean soils and the vadose zone beneath the site. (See comments 2 and 3).

The risk assessment is incomplete by not considering an appropriate worst-case irrigation-use scenario of the land, does not consider overall impact to the population, does not consider bioaccumulation or mutagenic effects on current and future generations and food chain resources, and does not consider cumulative risks from contaminants already in the groundwater system beneath the proposed ERDF location. (See comments 6 through 11 and 21).

The ERDF does not satisfy its objectives of preventing unacceptable direct exposure to the wastes, preventing unacceptable releases to the air and groundwater, and minimizing ecological impacts. (See comments 2, 5 and 12 through 14).

Response: Individual responses to these comments are provided below in the responses to "Attachment A".

Response to detailed comments on ERDF design, Attachment A.

1. Page 1-1: The documents state that remediation waste from the 100, 200 and 300 Areas is expected to consist of chemical, radioactive, and mixed waste.

Comment: Throughout the document there is no mention of how, or if, the remediation wastes would be segregated within the ERDF to assure the entire disposed volume does not become mixed waste. Segregation and minimization of the waste material is required under Chapters II and III of DOE Order 5820.2A. These aspects are important to properly utilize available resources and minimize all aspects of potential future treatment and disposal activities.

Response: There is no requirement in DOE Order 5820.2A to segregate hazardous/dangerous from radioactive waste. The Order states "waste shall be managed.... using the most appropriate combination of waste generation reduction, segregation, treatment, and disposal practices so that radioactive components are contained and the overall system cost effectiveness is maximized." Furthermore, the Order goes on to state, "waste shall be disposed of on the site on which it is generated, if practical." The ERDF does not inhibit waste reduction, segregation, treatment, or disposal practices by the operable units and does provide a cost effective, practical on-site remedial alternative.

Development of ERDF operational procedures, in coordination with the operable units, will serve to specify appropriate segregation, tracking, placement and control of waste. However, segregation of radioactive waste within the ERDF does not appear warranted. In the preliminary evaluation conducted for the performance assessment analysis of radionuclide releases, there is no indication that the mixed waste will have any influence on radionuclide behavior. Waste minimization efforts will be undertaken whenever feasible and cost effective. However, such actions have no real impact on the conclusions of the performance assessment analysis unless radionuclide inventories change significantly. The statement in the document is intended to indicate that ERDF will accommodate both waste types.

Much of the waste identified consists of contaminated soil resulting from the operation of reactor process ponds. Indications are that this waste is relatively homogeneous and would not be amenable to segregation. It is not yet clear if segregation of other waste at the operable units is necessary or feasible. As operable unit feasibility studies are completed, and remedial design is implemented, segregation of some waste may be appropriate.

2. Page 1-2: It is stated that supporting ERDF facilities including decontamination and leachate treatment systems will not significantly impact the long-term effectiveness of the site. Therefore, these facilities are not discussed in detail in the ERDF report. Also, leachate collection is not discussed.

Comment: It is not agreed that these supporting facilities should not be discussed in the report and that they may not have a significant impact on the long-term performance of the ERDF as it relates to protection of human health and the environment. As discussed in Appendix D of the document, significant volumes of leachate could be generated during operation of the facility.

Estimated volumes of decontamination wastewater are not discussed. Depending on the type of collection, treatment, and disposal proposed, the combined volumetric flow rate of these streams has the potential to significantly impact long-term contaminant availability to human and ecological receptors and thus the design and evaluation of the facility.

Response: The long-term performance of the ERDF using the chosen design does provide long-term protection. The double liner and leachate collection system is designed to provide a redundant safeguard against contaminant migration to the environment during operation. As leachate is generated and collected, it will be removed to the 200 Area Liquid Effluent Treatment Facility for processing, or, if appropriate, used (recycled) by other ERDF operations. Leachate generation will be closely monitored to assure that the system is functioning properly. As filling of a waste cell proceeds, an interim and final cover will be placed on top to significantly limit further leachate generation and impact to human and ecological receptors. Decontamination waste water is estimated to be of minor significance. The leachate collection capacity is currently designed to handle 220 thousand gallons for the first two disposal cells.

3. Page 1-3: It is stated in the document that the selected ERDF location was supported by recommendations provided by the Hanford Future Site Uses Working Group and, using CERCLA and CAMU criteria, because it is not located within a contaminated area of the Hanford Site.

Comment: It is not agreed that an area with uncontaminated soil should be used for the disposal of remediation wastes from the Hanford Site. The direct result of any disposal action within the proposed ERDF location would be the unnecessary and deliberate contamination of the underlying clean soil column and vadose zone and the continued contamination of the groundwater system. Furthermore, it is not agreed that location of such a facility in an area where contamination already exists would cause greater risk to the site workers since, in either case, the workers would be dealing with contaminated media and would essentially require that the same safety precautions be taken.

Response: The report correctly indicates that the ERDF is sited within the exclusive zone identified by the Hanford Future Site Uses Working Group for waste management activities and is compatible with their recommendations. Since the waste remediation strategy, and thus waste volume, is uncertain, a site was chosen that could accommodate all waste that may be generated during Hanford environmental restoration.

There are no alternative contaminated sites of the size that may be required by ERDF, with the exception of a site east of the ERDF location known as the BC control area. The contamination on that site is understood to be spot surface contamination, and therefore this site would be subject to the same objection raised in the comment concerning a clean soil column. Furthermore, if a site could be found having notable vadose zone contamination, problems would arise as to where to dispose of the excavated material.

4. Page 2-9: It is stated that 2 new effluent disposal facilities are planned for the 200 Area. These facilities are the Treated Effluent Disposal Facility Pond and the Effluent Treatment Facility Crib.

Comment: With the fact that ponds and cribs have long been the largest artificial source of recharge and contamination of the groundwater system beneath the Hanford Site, it is alarming to see such facilities still being proposed in an area such as the 200 Area where soil contamination exists (outside the ERDF) and where this contamination could be driven further into the underlying groundwater system. A systems-engineering approach must be taken with respect to all waste activities at the Hanford Site, focusing on treatment and beneficial reuse of the waste materials. Such an overall site evaluation is necessary to assure impacts from other projects are properly integrated and considered in accordance with National Environmental Policy Act (NEPA) requirements.

Response: The siting processes for both of the effluent disposal facilities have completed NEPA and State Environmental Policy Act (SEPA) analyses. The projects have considered such potential complications as mobilization of contaminants and sited the facilities to avoid negative vadose zone and groundwater impacts. Both facilities will seek a state permit.

The section in the RI/FS describes surface hydrological characteristics in the 200 Area and is not meant to imply that ERDF will be using such a facility to contain effluent generated during operation. The ERDF is planning to send contaminated leachate to the 200 Area Liquid Effluent Treatment Facility for treatment, if other uses cannot be identified. After treatment, the clean water may be discharged unless more beneficial uses are found.

5. Page 2-24: It is stated that the ERDF document has been expanded to include NEPA values not normally considered in a CERCLA RI/FS document. These values include socioeconomic, cultural resources, and transportation.

Comment: Nowhere in the document is there a discussion of the socioeconomic values placed on the land by the YIN, nor is there an assessment of how the ERDF site may impact the value of this land for current and future Indian generations. Also, although several historic areas have been identified that would be impacted by the ERDF (White Bluffs Road, basalt outcroppings and McGee Ranch) as well as artifacts and archaeological and paleontological areas within the ERDF, the report provides little consideration of these areas and the cultural and religious values placed on them by the YIN. The lack of concern over YIN values is typified in sections of the report that state the ERDF site will require an irreversible and irretrievable commitment of many resources including natural resources and borrow material. Also, shrub-steppe habitat, although important for many plant and animal species in the area and rapidly shrinking elsewhere in eastern Washington, would be completely destroyed by the ERDF site.

Response: Although not specifically found in the section on socioeconomic impacts, the RI/FS presents discussions about the value placed on the land for religious, cultural, and biological reasons in sections 9.4.2, Ecological Impacts; 9.4.4, Impacts on Historical and Cultural Resources; 9.4.10, Cumulative Effects; 9.4.11, Mitigation of Impacts from the ERDF; and 9.4.13, Potential Land-use Plan Conflicts. Significant consideration has been given to concerns expressed by the YIN. In response, DOE has committed that ERDF will not adversely impact Hanford Site basalt outcrops of religious significance. In addition, DOE intends to delay or avoid the construction of the connecting rail spur. Should the spur be vital to cleanup efforts in the

future, then the route would be re-evaluated to try to avoid injury to the White Bluffs Road. Material excavated from the ERDF site will be used to construct the surface barrier, to the extent possible, to avoid adverse impacts to other Hanford Site borrow areas. Although ecological impacts will be minimized to a great extent, the RI/FS appropriately acknowledges that some losses of habitat will occur as a result of ERDF construction.

6. Fate and Transport Model: The base condition fate and transport model to predict groundwater concentrations at the ERDF boundary assumes the facility has no bottom liner and a non-engineered top barrier with an infiltration rate approximately an order of magnitude higher than what would be expected under current climatic conditions at the site.

Comment: The base condition model should have assumed an irrigation-use scenario for the site as a possible worst-case situation. Such a future scenario is possible as part of traditional and cultural YIN use of the land for pasturing stock and is a likely non-Indian usage in any case. This scenario would have resulted in higher groundwater contaminant concentrations, faster travel times to the ERDF boundary and, therefore, far more contaminants of potential concern (including associated daughter products) being retained for evaluation in the risk assessment.

Response: The risk assessment modeled both current climate conditions and hypothetical wetter conditions. It was not considered realistic to model a strictly agricultural scenario on top of the waste facility. However, the "hypothetical wetter climate" analysis done in the RI/FS included a significant influx of water and could be considered to approximate such a scenario. The final condition at ERDF upon closure, is envisioned to include an engineered barrier placed over the waste disposal cells. The barrier will be relatively higher than the surrounding terrain and incorporate both active and passive controls to allow limited surface use. As mentioned above, in a preliminary performance assessment, the irrigation scenario is considered an inadvertent intrusion scenario. The resultant dose created by enhanced infiltration would be matched by the performance objective (4 to 100 mrem/yr).

7. Page 5-1: It is expected that the contaminants of greatest concern from an ecological perspective will be identified with a human health risk-based screening process.

Comment: Without supporting facts, it is not agreed that human health screening values are also appropriate for ecological receptors. In addition, the report does not consider cumulative effects of exposure on the food chain cycle and how these exposures may ultimately effect human health and the religious, cultural, and socioeconomic values placed on the land and its resources by the YIN, including its future generations.

Response: The goal of the ERDF baseline risk assessment is to evaluate the likelihood that adverse ecological effects may occur if organisms are exposed to contaminants that may be disposed in the facility. The goal of baseline risk assessment per 40 CFR 300.43 (e)(2)(i)(G) is to characterize current and likely future ecological risk attributable to releases of contaminants, especially when sensitive habitats and critical habitats of species protected under the Endangered Species Act may be impacted. The relatively simple ecological risk assessment provided in Chapter 6 demonstrates that

unacceptable ecological risk would result if the wastes to be received at the ERDF *were released to the environment.* This conclusion would not be altered if a more complex risk assessment were conducted. Based on the conclusions of the risk assessment, the proposed remedial alternative is designed to prevent release of waste to the environment, thereby eliminating ecological risk associated with the waste. Furthermore, the report acknowledges that physical ecological impacts (i.e., stressors) will occur at the ERDF site due to construction. These impacts have been explicitly evaluated as part of the short-term effectiveness criteria (see Section 9.2) and significant design modifications have been implemented to minimize the size of the facility and the magnitude of the impacts.

8. Page 5-3: Benzo (g, h, i) perylene, 4-chloro-3-methylphenol, dibenzofuran, 1,3-dichlorobenzene, 4-methylphenol and sulfate contaminants in the soil do not have toxicity values with which to perform risk-based screening calculations. These contaminants were therefore not considered to be of concern for disposal at the site.

Comment: Surrogate toxicity values should have been assumed based on similarities with other available chemical data.

Response: These constituents are not significant contaminants. Assuming toxicity values based on surrogates that are likely to provide a poor representation of toxicity could be quite misleading. It is more appropriate to state that the toxicity information is not available. These contaminants could be reassessed at the operable unit level if significant quantities are encountered and/or toxicity information becomes available. Furthermore, with the exception of sulfate, these contaminants are organic compounds that will degrade with time and are highly unlikely to reach groundwater. Sulfate does not have toxicity values because it is not a toxin except in rather extreme conditions at very high concentrations. Sulfate is not a significant waste product at the Hanford site and does not warrant additional consideration.

9. Page 6-1: Exposure to contaminated groundwater is only evaluated for human receptors. Use of contaminated groundwater for crops or livestock is assumed not to occur.

Comment: Assuming groundwater will not be used for irrigation or livestock places unreasonable restrictions on future use of the land by the YIN and therefore presents an incomplete assessment of risk from exposure to the groundwater contaminants. Groundwater use for irrigation and livestock should be evaluated and incorporated into an inter-related ecological/human health risk assessment.

Response: Groundwater beneath the ERDF site has been compromised from contaminant plumes emanating from the 200 West Area. These plumes render the use of groundwater for irrigation and livestock questionable. Furthermore, as indicated by the RI/FS Hydrologic Evaluation of Landfill Performance (HELP) modeling, no contaminants are expected to reach groundwater from ERDF in significant concentrations, using the specified design and current climatic conditions, for more than 10,000 years.

The potential for human dose through the consumption of contaminated crops, meat, and milk are evaluated in the performance assessment analysis. This is done in the "all pathways" scenario where contaminated groundwater is drawn from the aquifer and used for irrigation and raising livestock. The "groundwater drinking" scenario is also considered where dose is received by drinking the groundwater. Because the performance objective is lower for this scenario (4 versus 25 mrem/yr) and because the majority of dose is attributed to the drinking water pathway, this scenario turns out to be more limiting in terms of accepting radionuclide inventory in the ERDF. The performance objectives to limit dose in DOE Order 5820.2A apply only to humans.

10. Page 6-33: The risk assessment for soils under the 500-year drilling scenario assumes that, as contaminated soil is brought to the surface, it is spread out over the site. This results in a 1,000-fold dilution of the contaminant concentration.

Comment: It is not agreed that this is a reasonable assumption for determining potential future risk from exposure to contaminated soils. The highest exposure would occur during handling as the soil is removed from the ground. This is before it could be spread out over the land and subsequently diluted. The ecological impact of this scenario and its interrelationship with human effects should also assume exposure to the drill cuttings prior to any dilution. Soil concentration limits for waste accepted at the ERDF should therefore be much lower than what is presented in Appendix C.

Response: The assumptions regarding drill cuttings are appropriate because waste materials will account for a fraction of the soil column and cuttings are normally prevented from build-up at the surface and are dispersed. Chronic exposure is considered likely to result in more severe hazard than acute exposure for the waste concentrations expected. Acute exposure was not considered a significant pathway in the RI/FS. The performance assessment analysis considers the scenario described in Comment 10. It is referred to as the drilling scenario. A dilution factor is not accounted for in this analysis. This scenario is considered to be an "acute exposure" scenario, because a human would be exposed for a relatively short period of time. The results of this scenario are compared with the "chronic exposure" scenario which is the long term agriculture scenario (referred to as the "postdrilling scenario"). Because the performance objective for the acute scenario is 5 times that of the chronic scenario (500 versus 100 mrem per year), the relative estimated dose is more severe for the chronic case. Thus, the limiting scenario in terms of acceptable dose, and therefore acceptable radionuclide concentrations, is the postdrilling scenario. As indicated in response to Comment 6 above, the design will incorporate both active and passive controls to limit such incidents as drilling through the facility.

11. Risk Assessment: The risk assessment is considered short-sighted and incomplete in that it 1) assesses only the carcinogenic and non-carcinogenic effects from exposure to the contaminants on a single most-exposed individual and ignores effects on the overall population; 2) focuses only on the effects of contaminant exposure on an individual of this generation and ignores other effects, such as bioaccumulation and mutagenesis, that may affect future generations; 3) ignores bioaccumulation and mutagenic effects within and upward through the food chain and; 4) does not consider additive risks from contaminants already in the underlying groundwater system. Also, as discussed

above, the risk assessment should have included many more contaminants of concern based on a worst-case irrigation-use future scenario of the land.

Response: The risk assessment in the RI/FS was performed in accordance with CERCLA methodology and consistent with the Hanford Site Risk Assessment Methodology. CERCLA risk assessment methodology does not provide means to assess mutagenic or population effects. Bioaccumulation within the food chain is generally a second-order effect compared with direct consumption of contaminated groundwater. Because groundwater will not be impacted in excess of allowable levels, use of the groundwater for irrigation would not be expected to result in impacts to agriculture.

Additive increases in groundwater radionuclide concentrations from multiple sources are being considered qualitatively in the performance assessment. Several conclusions drawn from the preliminary analysis are:

- The location of the ERDF is far enough south of other potential sources of long term contamination that hydrologic flow patterns are likely to prevent the potential ERDF plume from lining up with plumes from most other sources. Potential additive sources could be US Ecology, contaminated soil columns in the south end of the 200 West Area, the southernmost solid waste burial grounds, and whatever tank farm wastes that might be left in-situ. Of these, the greatest uncertainty lies with the tank farm waste source. It is concluded preliminarily that releases from the other sources are likely to present small potential for contaminating the aquifer because of the low inventory of long-lived mobile radionuclides and that the likelihood of these sources lining up so as to be additive (e.g., in the same volume of groundwater) is small.

- The long term dose emanating from ERDF is expected to be quite small. Using conservative assumptions about probable inventory and driving forces, the total potential drinking water dose from an ERDF derived plume is estimated at 3 mrem/yr without any waste form performance. If necessary, waste form performance can be used to further immobilize waste and reduce the estimated dose by a factor of 10 or more. Thus, even if additive doses occurred, it is not expected that the contribution from the ERDF would be significant.

- Interaction of an ERDF plume with presently existing radioactive plumes underneath ERDF is not expected because the contaminant concentrations in the present plumes should decline before an ERDF plume could reach the aquifer. Dissipation of existing plumes will occur unless there remains sufficient inventory in the soil column to sustain the present plumes. We note, however, that the plumes consist of highly mobile radionuclides and that the plumes were created under very high infiltration rate conditions. It is unlikely that a significant inventory of these radionuclides remains in the soil column.

As mentioned above, with regard to the worst case irrigation scenario, the position taken in a performance assessment is that this scenario is an inadvertent intrusion scenario. The resultant dose created by enhanced infiltration would be matched by the performance objective (4 to 100 mrem/yr). Thus, relative increase in potential dose is acceptable under these circumstances.

12. Page 7-21: The first remedial action objective specified for the ERDF site is to support the removal of contaminants from portions of the Hanford Site (including near the Columbia River) in a timely manner.

Comment: While it is stated in the document that the ERDF is proposed to support this objective, other means such as recycling and treatment of the remediation wastes with deep geologic disposal would result in greater long-term protection of human health and the environment at Hanford, while releasing remediated areas to other productive uses. These other means can incorporate best available technologies that can be implemented in a timely manner. They would also prevent contamination of yet another area of the Hanford Site by improper waste disposal practices. The melter/slagger process which is in commercial use at Oak Ridge is an example of a technology that could be used to reduce the volume and mobility of radioactive wastes. Calcining would reduce the toxicity, mobility, and volume of chemical wastes.

Response: Appropriate recycling and treatment of remediation waste will be determined on a case by case basis at the operable units. Deep geologic disposal is currently not an option, nor would most of the anticipated remediation waste be a candidate for such disposal. At this time, specific remediation alternatives have not been selected. Depending on the waste, the selected alternative may include treatment to reduce toxicity, volume, and/or mobility of the material. Alternatives such as calcining, recovery/waste separation processes, soil washing, and in-situ techniques are potential options.

13. Page 7-21: Other remedial action objectives for the ERDF site include preventing unacceptable direct exposure to waste, preventing unacceptable contaminant releases to air, preventing contaminant releases to groundwater above ARARs and risk-based criteria, and minimizing ecological impacts.

Comment: The ERDF site does not meet any of these objectives. Risk from direct exposure to the waste would be significantly increased through use of the ERDF because of the multiple handling procedures involved in excavation and disposal of the material as well as associated decontamination activities. Any treatment of the waste after disposal at the ERDF would require additional handling and therefore result in even more unnecessary exposure.

The potential for contaminant releases to the air would be increased through multiple handling scenarios and cross-site transportation of the waste materials. Dust suppressant materials would be considered unacceptable and unreliable to minimize or eliminate such potential dispersion. Disposal of the waste material in the ERDF would result in contamination of clean soil and the vadose zone beneath the facility as well as unacceptable contamination of the underlying groundwater system. Extensive and possibly irreparable damage to the habitat and cultural and socioeconomic value of the area would result from construction of the ERDF site. Construction of the site would also result in an unacceptable situation of Hanford land being "sacrificed" as part of the overall cleanup effort.

CERCLA guidance would indicate the ERDF does not provide an acceptable level of overall protection of human health and the environment based on long-term effectiveness and permanence of the facility. In addition, under CERCLA, EPA expects remedial alternatives to use treatment to reduce the toxicity, mobility and volume of the contaminants wherever possible. However, the very nature of, and justification for, the ERDF site would inhibit development of innovative technologies for treatment of contaminants at Hanford. As stated on page 9-28 of the document, the ERDF would result in alternatives involving excavation and disposal ranking higher in operable unit RI/FS documents versus alternatives that involve treatment mechanisms. The ERDF is therefore inconsistent with and precludes implementation of the YIN's expected final remedy for the Hanford Site and thereby violates section 300.430 (a) (ii) (B) of CERCLA.

Response: As indicated in response 2b. above, concerning 300.430 (a)(ii)(B) of CERCLA, the ERDF is neither inconsistent with nor precludes any option the operable units may evaluate for a final remedy. The existence of ERDF is consistent with the selection of the an effective remedial alternative for the operable units involving waste disposal. The ERDF makes available an option to move waste to an engineered facility having significant waste isolation capabilities. If a removal action is the option chosen, then waste handling steps would be necessary. Indications from waste site excavation treatability tests show that material handling will present a minimal dust hazard potential.

The RI/FS shows that the ERDF design will effectively isolate waste from the environment for many years and the performance assessment provides additional information. The preliminary performance assessment analysis indicates that the underlying groundwater aquifer will not be contaminated with concentrations that would exceed the allowable limits. Risk related to exhumation of waste after disposal is considered only as an inadvertent intrusion scenario. The estimated doses from this scenario are also below the performance objective dose limits.

The stated ERDF remedial action objectives apply to ERDF itself. Isolation of waste in an engineered facility, that meets or exceeds technology requirements, is more protective than leaving the waste in place without such controls. Predictive HELP modeling in the RI/FS shows that contaminants will not significantly affect groundwater for more than 10,000 years. Actual migration times could be considerably longer since modeling input parameters were quite conservative; e.g., higher than expected infiltration rate and contaminant solubility, plug flow through the vadose zone, no lateral dispersion, 28 million cubic yards of waste <u>all</u> having the highest contaminant concentration yet found for <u>every</u> constituent, a very large disposal trench (1,400 ft wide by 9,800 ft long), a homogeneous isotropic media.

The ERDF design footprint has been sized to minimize ecological impacts and sited so as to avoid more sensitive habitat areas. In addition, DOE has been working to coordinate mitigative actions with the Trustees. Cultural resource surveys show that no prehistoric sites have been found where ERDF is currently sited.

The RI/FS does not intend to imply that removal and disposal would be the preferred alternative. Rather, the report indicates that if ERDF did not exist as an option, operable units may be constrained to rank in-situ remedies high. For waste sites that pose a risk to human health and the environment, particularly near the river, removal may in fact be the preferred solution.

14. Page 84: Permanent disposal of low-level mixed wastes from Hanford at an off-site facility or geologic repository is not retained based on poor short-term effectiveness, low implementability and high cost.

Comment: It is not agreed that offsite disposal of Hanford wastes should be eliminated from further consideration. Although significant volumes of waste material may be generated as part of remediation of the source and groundwater operable units, the driving force would be to identify and implement recycling and treatment technologies to minimize the final waste volume requiring disposal and reduce or eliminate its toxicity and mobility to render it safe for handling and offsite transportation. As previously stated, the ERDF does not encourage or anticipate the development of innovative actions and results in poor long-term planning for protecting human health and the environment. Therefore, when considered over the long-term with necessary institutional controls, it is likely the overall costs of the ERDF significantly out-weigh costs associated with systems-engineered treatment and potential off-site disposal in a permanent deep repository requiring no institutional controls.

Furthermore, it is not agreed that off-site disposal would present significantly greater short-term public risks versus an onsite waste management facility. Operation of the ERDF would result in a significant amount of handling of the untreated waste material and potential for dispersion over transportation routes to the facility. Decontamination activities also create an unnecessary potential for risk. Systems-engineered treatment facilities, such as calcining and the melter/slagger process at Oak Ridge, would not only result in lower short-term risks by rendering the waste safer to handle and transport, but also satisfy the much larger goal of providing effective long-term protection and permanence. Also, given sound engineering practices, public opposition to off-site disposal would be minimized.

Response: During the feasibility study phase, the operable units analyze remedial options using the nine CERCLA criteria as a ranking mechanism. The process is intended to identify, evaluate and implement feasible and cost effective innovative technologies to reduce mobility, toxicity and/or volume. ERDF waste acceptance criteria will impose limits based on results of the DOE 5820.2A performance assessment and legal standards imposed by applicable or relevant and appropriate requirements.

The facility will be limited to two lined cell at the outset, with a waste capacity of approximately 1 million cubic yards. The ERDF is intended to operate much like a commercial facility, and encourage innovative measures to reduce volume and various waste characteristics. Transportation of waste over a greater distance (e.g., to an offsite repository), regardless of form, results in an increased risk of accident. Deep geologic disposal is not currently an option, nor is it likely to be in the foreseeable future. No

fully satisfactory method currently exists to treat radionuclides or inorganic waste to reduce volume or toxicity. It may be most effective to consolidate waste at an engineered facility, designed to current state-of-the-art landfill standards, where, if necessary, it can be subsequently dealt with more efficiently.

15. Page 8-17: Land use restrictions can include zoning and deed restrictions to limit future land use and activities.

Comment: Actions such as these portend unacceptable permanent restrictions on future use of the land by YIN people. Again, the long-term picture of Hanford and the release of land for unrestricted beneficial use is not being considered as an alternative by DOE. Such an alternative should be evaluated allowing detailed evaluation of impacts consistent with NEPA requirements.

Response: We do not believe the construction, operation, and closure of ERDF will violate any YIN treaty rights. After the post-closure period, the ERDF site and surrounding area would be capable of supporting surfaces uses compatible with many possible land use options, including any treaty rights that might be applicable.

The ERDF is being constructed to offer a means to consolidate waste from many waste units across the Hanford Site. The overwhelming intent expressed by the public, is to initially return areas along the Columbia River to beneficial use. Much of the technology exists to remove and safely handle waste from the 100 Areas, as well as to segregate and treat waste, as appropriate. The most daunting contamination problems at Hanford are in the 200 Areas. Technologies are not currently available to effectively handle many of the difficulties and achieve satisfactory cleanup of these areas. Consequently, the 200 Areas will likely remain a concern for some time. As recognized by the Hanford Future Site Uses Working Group and others, the 200 Area plateau will be used for waste management activities well into the foreseeable future.

16. Page 8T-1a: The ERDF, identified as a centralized engineered facility, is retained for further consideration. Engineered facilities at source operable unit sites are not retained.

Comment: The ERDF, while a centralized facility requiring engineering to construct, operate, and close, is not a systems-engineered facility that will result in the long-term protection of human health and the environment. Systems-engineering is the only viable means of effectively and efficiently using available resources to remediate the Hanford Site in a manner that will result in the long-term protection of human health and the environment and the release of land for unrestricted beneficial use. By continuing to consider an ERDF and source operable unit systems, Doe persists in ignoring this approach.

Response: A systems approach is being implemented. The ERDF will be a fully compliant facility that is operated much like a commercial landfill. The operable units will evaluate and implement a cost effective, and technically sound approach to remediating waste sites. Should removal and disposal be chosen as the best alternative, a system will be in place to handle that option.

17. Page 9-11: A grout batch plant is a support facility for the ERDF.

Comment: Grouting is a short-term measure that does not provide for the long-term protection of human health and the environment. Grouting also increases the volume of waste material by a factor of 5, resulting in far more material that may require future treatment and disposal. Other technologies such as recycling, waste minimization, in-situ soil washing, and other innovative waste treatment such as calcining, tritium recovery, and the melter/slagger process at Oak Ridge should be evaluated as part of the systems-engineering approach to cleanup of the Hanford Site. As we have noted in the past relative to the proposal to use grout: to immobilize a low-level stream of high-level radioactive waste in tanks at Hanford, we consider the dilution of wastes with grout and the resulting additional difficulty created to eventually retrieve and remediate the wastes in the future is unsatisfactory.

Response: The grout plant originally planned for ERDF was for subsidence control, not for waste treatment purposes. A grout plant is no longer planned to be a support facility for ERDF. To a limited degree, ERDF may use grout to fill void spaces as a stabilization and subsidence control measure. Waste will first be compacted to minimize void space and the need for grout. To fill remaining voids will not increase waste volume.

The operable units must consider various options and, depending on numerous factors, including risk, chose the best remedial option. In some instances, grouting may provide the most effective means to immobilize contaminants, e.g., uranium. Furthermore, for certain wastes, this or other forms of treatment may be required to meet ERDF waste acceptance criteria.

18. Page 9-12: It is estimated that 28.5 million cubic yards of remediation waste could be disposed of at the ERDF.

Comment: Although the ERDF has been designed for the containment of remediation wastes from the 100 and 300 Areas, the facility does not discuss what will be done with wastes from other operable units (source and groundwater) at the Hanford Site. Because of the large amount of waste across the site, recycling and volume reduction methods as part of the systems-engineering approach to cleanup must be considered to effectively and efficiently utilize existing resources to provide for the long-term and permanent protection of human health and the environment.

Response: The ERDF will be available to accept waste from any operable unit in the 100, 200, or 300 National Priorities List sites on Hanford. See above responses concerning operable unit obligations, recycling, and volume reduction.

19. Page 10-2: The document states that it appears as though most of the waste will meet the acceptable soil concentrations for disposal at the ERDF. For the contaminants that may exceed acceptable levels (metals and radionuclides), no treatment technologies exist for reducing concentrations.

Comment: This statement lays out what appears to be the unacceptable criteria by which the ERDF would be operated and the impact of the ERDF on remediation strategies at the Hanford Site. The ERDF would become a disposal facility for any and all wastes regardless of contaminant concentrations, result in significant increases in the volumes of waste being disposed or requiring future treatment and disposal (in violation of DOE order 5820.2A), and inhibit the development of recycling and innovative technologies, such as calcining, the melter/slagger process at Oak Ridge or in-situ soil washing, to render the contaminants less available to potential receptors to destroy contaminants or to reduce their volume.

Although the DOE is pushing the need for the ERDF behind the guise that other areas could then be remediated and released for other beneficial uses, the long-term result will be that the ERDF will be a "sacrificed' area and a permanent source of potential ecological and human risk through release of contamination via various exposure pathways. This represents an unacceptable danger and liability to future generations.

Response: The analysis provided in a performance assessment is used to (1) estimate potential dose that could result from the projected radionuclide inventory to be placed in the ERDF, and (2) establish radionuclide specific concentration and inventory limits for the ERDF. Comparison of potential dose with dose limits has shown that the inventory to be placed in ERDF, as described in the RI/FS, is acceptable. As indicated above, ERDF will establish the required waste acceptance criteria. Further, waste acceptance criteria are being developed to ensure that wastes with unacceptably high inventories are properly immobilized or otherwise managed in an appropriate manner.

The dominant contamination problem at Hanford is due to radionuclides and inorganics (metals), these can neither be destroyed or inactivated. They can, to various degrees, be immobilized and made less available to the environment. Again, as required, the operable units must consider options to determine the most effective means to remediate waste units. It may be appropriate to consolidate and/or contain contaminants that currently pose a threat.

20. Page C-2: Leachate concentration limits for the ERDF were back-calculated using target groundwater concentrations resulting in an hazard quotient (HQ) of 1 and an incremental cancer risk (ICR) of 1×10^{-5} via ingestion and inhalation pathways. However, acceptable soil concentration limits corresponding to the calculated leachate limits were not determined, because of uncertainties in the waste release calculations.

Comment: It is unclear why acceptable soil concentration limits could not be determined from the acceptable leachate concentration values. This is the reverse of the calculations used in the base conditions model. Therefore, the same mechanisms and input parameters should apply.

Also, it is unclear what is meant on Page A-9 where it states for the base conditions model "... it was assumed that the waste would not generate leachate concentrations that exceeded the acceptable leachate limits... by ensuring that the input solubility did not exceed the leachate limits." This

appears to indicate contaminant solubility parameters were manipulated in such a way that, regardless of contaminant concentrations in soil disposed of at the site, the resultant leachate concentrations would not result in a groundwater risk with an HQ greater than 1 or an ICR greater than 1 x 10^{-5}.

Response: Risk-based and ARAR-based target groundwater concentrations were determined for the constituents that were not eliminated in the screening step. The risk-based standards were determined using a target ICR of $1x10^{-5}$ and a HQ of 1, and were calculated for the groundwater ingestion and volatile inhalation pathways, assuming Hanford Site Baseline Risk Assessment Methodology (DOE-RL 1993) residential exposure parameters. Whereas the original spreadsheet model calculates leachate and groundwater concentrations based on bulk soil concentrations in waste, the modified spreadsheet model performs the reverse calculation; that is, it calculates leachate concentrations based on target groundwater concentrations. Since leachate concentrations cannot exceed solubilities, and experimental solubilities of the waste are unknown, it would be erroneous to impose a concentration limit for waste without supporting data. Determination of waste solubilities will allow bounding waste concentrations to be calculated using the known leachate limit.

In a performance assessment, analyses are not constructed to consider relative risk. Instead, relative dose is considered. The results are used to determine acceptable waste concentrations and waste inventories, as appropriate. As stated in the previous comments, the results suggest that the projected inventory is acceptable in the ERDF.